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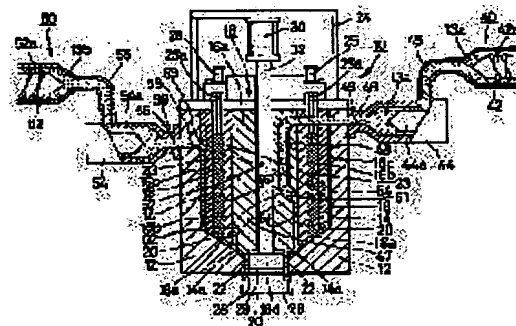
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(54) MULTI-LAYER BLOW MOLDING METHOD**(57)Abstract:**

PURPOSE: To always accurately adjust a mixing ratio, at a time of the supply of a main resin and an auxiliary resin to an accumulator, by adjusting the flow-down amt. of the auxiliary resin by a flow rate adjusting ring while adjusting the flow-down amt. of the main resin on the basis of the resin extruding speed of a plunger.

CONSTITUTION: When a multilayered parison 70 wherein the whole of a duct is composed of a soft resin (main resin) 13a having flexibility and a part of the duct is composed of a hard resin (auxiliary resin) 13b is formed, at first, the plunger 44a of a main resin accumulator 44 is allowed to advance and the molten main resin 13a is supplied to a resin introducing passage 48 and introduced into a land part 65 from the lower edge of a main resin manifold 47. The auxiliary resin 13b is introduced into a land part 66 from the lower edge of an auxiliary resin manifold 57 and both resins are extruded from a resin emitting port 28 to obtain the multilayered parison 70. At this time, the flow-down amt. of the auxiliary resin 13b is adjusted by the passage adjusting ring 23 freely displaced by a cylinder 25 and that of the main resin 13a is adjusted based on the resin extruding speed of the plunger 44a.

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CLAIMS

[Claim(s)]

[Claim 1] The division mandrel which connected to the separate accumulator the extruder which supplies principal member resin, and the extruder which supplies secondary-member resin, and was divided into dice housing in same axle from the accumulator plunger is interpolated. Pressurization supply is carried out towards the dice with which the resin path was formed. After branching from the resin path inlet port by the side of an accumulator to hoop direction right and left of a division mandrel front face, a connoisseur faces [carrying out the laminating of principal member resin and the secondary-member resin in the thick direction], respectively each manifold which curved to the direction of extrusion toward the anti-resin input of said division mandrel. The multilayer blow molding approach characterized by adjusting the flow rate of the secondary-member resin which flows down a secondary-member resin path with the path adjusting for secondary members prepared in the method of outside [path / principal member resin].

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the multilayer blow molding approach.

[0002]

[Description of the Prior Art] When performing a multilayer blow conventionally using a multilayer blow molding machine, the resin extrusion rate of an accumulator plunger performed thick adjustment of class resin and rate adjustment of a partition ratio, and control was performed by die gap adjustment in the thick adjustment as the whole parison.

[0003]

[Problem(s) to be Solved by the Invention] However, there were the following problems by the above-mentioned conventional approach. That is, there was a problem of it not being difficult or not causing pulsation, or the piece in the unnecessary part of secondary-member resin causing a cobwebbing phenomenon bad, it mixing in principal member resin that responsibility obtains bad secondary-member resin thickness predetermined in a desired location since the resin path to the dice lower part where parison injection is performed from the accumulator with which extrusion of resin is performed is long, and playback use becoming impossible.

[0004] Paying attention to the above-mentioned conventional trouble, this invention is good in the piece in the unnecessary part of secondary-member resin, and aims at offering the multilayer blow molding approach that class thickness and mixing percentage can be adjusted more correctly.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the multilayer blow molding approach concerning this invention The division mandrel which connected to the separate accumulator the extruder which supplies principal member resin, and the extruder which supplies secondary-member resin, and was divided into dice housing in same axle from the accumulator plunger is interpolated. Pressurization supply is carried out towards the dice with which the resin path was formed. After branching from the resin path inlet port by the side of an accumulator to hoop direction right and left of a division mandrel front face, a connoisseur faces [carrying out the laminating of principal member resin and the secondary-member resin in the thick direction], respectively each manifold which curved to the direction of extrusion toward the anti-resin input of said division mandrel. The flow rate of the secondary-member resin which flows down a secondary-member resin path with the path adjust ring for secondary members prepared in the method of outside [path / principal member resin] was adjusted.

[0006]

[Function] According to the above-mentioned configuration, it is filled up with principal member resin and secondary-member resin towards each accumulator from the extruder for principal members, and the extruder for secondary members. Although, as for the secondary-member resin with which resin is supplied through each manifold and principal member resin and secondary-member resin flow down a secondary-member resin path, the amount of flowing down will be adjusted by the secondary-member resin flow control ring if the pressurization drive of the plunger is carried out, by performing adjustment of the amount of flowing down of principal member resin with the resin extrusion rate of an accumulator plunger, the secondary-member resin for which it asks to the exterior side of the parison thick direction is mixed, and multilayer parison is fabricated.

[0007]

[Example] Below, the concrete example of the multilayer blow molding approach concerning this invention is explained with reference to a drawing at a detail.

[0008] The sectional view of the important section equipment applied to the multilayer blow molding approach which starts an example at drawing 1 is shown, and the extruder, the accumulator, and the parison injection dice are shown. First, the dice 10 has the dice housing 12 which consists of a square shape block, and the penetration bore 14 of a circular cross section is mostly drilled along with the vertical center line. Where sequential diameter reduction is carried out, the bore is carrying out opening of it to the lower limit side of the dice housing 12, as such a penetration bore 14 reaches [from the middle] the lower limit side of the dice housing 12.

[0009] In said dice housing 12, the mandrel 16 formed in the minor diameter from the penetration bore 14 is inserted in. The mandrel 16 concerned is constituted by the division mandrel configuration which made main mandrel 16a of a circle configuration located in the core of a dice 10, internal ring mandrel 16b located in the periphery section of main mandrel 16a, the path adjust ring 23 for secondary members which can be moved up and down, and external ring mandrel 16c located in the outermost layer 4 layer structures in same axle. That is, in the dice housing 12, external ring mandrel 16c of the shape of a cylinder formed in the minor diameter from the penetration bore 14 is arranged, and the secondary-member resin path 18 of the die length which results at the lower limit section of internal ring mandrel 16b between the peripheral face of the external ring mandrel 16c concerned and the inner skin of the penetration bore 14 is formed.

[0010] Moreover, the peripheral face from the middle of main mandrel 16a to a lower limit side is engraved on a circle configuration, and the principal member resin path 20 is formed between the inner skin of the internal ring mandrel 16b concerned. Furthermore, between diameter reduction section 14a of the penetration bore 14 of dice housing 12 lower part, and a mandrel 16, the hybrid resin path 22 of the die length which reaches the resin delivery 28 is formed.

[0011] Although the lower part of a mandrel 16 extracts according to the diameter reduction section of the penetration bore 14 and the tip is formed, a part especially for a point is equipped with parison control core 16d possible [receipts and payments] from the mandrel 16. Opening of the penetration bore 14 is attended and the mandrel lip 29 which forms the circular ring-like resin delivery 28 between openings of the penetration bore 14 is formed at the concerned parison control core 16d tip in one. Therefore, the die gap of the resin delivery 28 can be changed now into arbitration by changing the parison control core 16d amount of receipts and payments.

[0012] Modification of a die gap is enabled by the drive of the control cylinder 30 fixed to the buttress plate 24 set up on the dice housing 12, and main mandrel 16a is made to penetrate the rod 32 which connects a control cylinder 30 and parison control core 16d for this reason.

[0013] On the other hand, the principal member resin feeder 40 which supplies principal member resin 13a, and the secondary-member resin feeder 50 which supplies secondary-member resin 13b are attached in the dice 10, respectively. Said resin feeders 40 and 50 explain the structure of only the principal member resin feeder 40 for the same configuration, and omit the explanation about the secondary-member resin feeder 50. The principal member resin feeder 40 (50) consists of an extruder 42 for principal members (52), and an accumulator 44 for principal members (54), and the accumulator 44 for principal members (54) is attached in the dice housing 12. This accumulator 44 (54) is what interpolated plunger 44a (54a), and he is trying to generate the injection pressure of parison 70 by making adjustable content volume of the accumulator 44 for principal members (54), pressurizing principal member resin 13a (13b) supplied to the interior, and sending into a dice 10 by driving in the injection cylinder which does not illustrate plunger 44a (54a).

[0014] In order to send resin into a dice 10 from the accumulator 44 for principal members (54), the nozzle section 46 (56) was formed at the tip of the accumulator 44 for principal members (54), flange association of this was carried out at the dice housing 12, and the principal member resin installation way 48 (58) and the nozzle path 49 (59) which result in the below-mentioned manifold 47 for principal members (57) formed in main mandrel 16a (external ring mandrel 16c) are connected. Furthermore, although the extruder 42 for principal members (52) is connected to the accumulator 44 for principal members (54) through the extrusion path 45 (55) in order to carry out measuring supply of the principal member resin, this is

connected behind the accumulator 44 for principal members (54). Screw 42a (52a) is prepared free [rotation and order **] in the state of loosely fitting in the extruder 42 for principal members (52). [0015] Principal member resin 13a (13b) supplied to the principal member resin input 61 (63) from the nozzle path 49 (59) for the accumulator 44 (54) connection for principal members established in the peripheral wall of the dice housing 12 is first branched to hoop direction right and left of main mandrel 16a (16c). Moreover, the path cross section The manifold 47 for principal members of the shape of a semicircle cross section which curves to the direction of extrusion with predetermined curvature (57) is formed predetermined coming out comparatively and making it decrease gradually. And this manifold 47 (57) edge for principal members is formed so that it may join in the location of about 180 degrees, respectively from the manifold 47 for principal members (57) and said principal member resin input 61 (63) by the side of the opposite side used as the symmetry.

[0016] Joint unification of this unification section 62 (64) is carried out so that the line by which the manifolds 47 for principal members of the unification symmetry (57) met the axis of main mandrel 16a may be touched. Consequently, the elementary stream of the principal member resin which flows down the manifold 47 for principal members (57) becomes parallel in the unification section 62 (64). The land 65 (66) in which the whole principal member resin path 20 (18) from the margo inferior of the manifold 47 for principal members (57) to the hybrid resin path 22 forms a path shallower than the path cross-section depth of the manifold 47 (57) part for principal members is formed, and this is formed by the periphery of main mandrel 16a (16c) shaving off, and adjusting the depth as mentioned above.

[0017] Moreover, in order to control the flow of [secondary-member resin 13b which flows down the secondary-member resin path 18], between internal ring mandrel 16b and external ring mandrel 16c, these and the path adjust ring 23 for secondary members prepared in same axle fix in the lower limit section of rod 25a which engaged with the secondary-member resin flow control cylinder 25, and is arranged possible [vertical movement].

[0018] Although he is trying to form multilayer parison using the blow molding machine concerning such a configuration, this shall be performed as follows.

[0019] The shaping symmetry in this example forms the so-called multilayer parison to which the whole duct made the elasticity resin (principal member resin 13a) which has flexibility, and some ducts rigid resin (secondary-member resin 13b) like the air intake duct of the engine of an automobile, or the indoor duct for air conditioning of an automobile, as shown in drawing 3 . First, it sets to the location which has the same flat surface as external ring mandrel 16c and both the lower limit side of internal ring mandrel 16b which adjoin the lower limit side of the path adjust ring 23 for secondary members. Subsequently, it is made to extrude, retreating plunger 44a from the extruder 42 for principal members to the accumulator 44 for principal members using principal member resin 13a of a duct which was mentioned above, and on the other hand, it is extruded and filled up, retreating plunger 54a from the extruder 52 for secondary members to the accumulator 54 for secondary members using secondary-member resin 13b.

[0020] Subsequently, principal member resin 13a fused when plunger 44a of the accumulator 44 for principal members was advanced minds the resin installation way 48 from the nozzle path 49. It flows from the principal member resin input 61, and principal member resin 13a branches right and left with the manifold 47 for principal members, and reaches the unification section 62. At this time with branching flowing down Carrying out overflow to a land 65 serially from the margo inferior of the manifold 47 for principal members, principal member resin 13a flows to homogeneity at the perimeter of a resin path. And since the slot cross section of the manifold 47 for principal members is set up so that it may become small gradually, the pressure distribution of a hoop direction become uniform and it flows down toward the resin delivery 28 through the hybrid resin path 22.

[0021] Secondary-member resin 13b fused on the other hand when secondary-member resin 13b also advanced plunger 54a of the accumulator 54 for secondary members like principal member resin 13a flows through the secondary-member resin input 63 from the nozzle path 59, and secondary-member resin 13b branches right and left with the manifold 57 for secondary members. The unification section 64 is reached, overflow is serially carried out to a land 66 from the margo inferior of the manifold 57 for secondary members with branching flowing down, and secondary-member resin 13b flows to homogeneity at the perimeter of a resin path. And since the slot cross section of the manifold 57 for secondary members is set

up so that it may become small gradually, hoop direction distribution becomes uniform and it flows down toward the resin delivery 28 through resin path 18a of the letter of an inclination from the perpendicular-like resin path 18, and the multilayer parison 70 is obtained, mixing discontinuous hard secondary-member resin 13b as shown in drawing 3 from the resin delivery 28 in the part for which continuous elastic principal member resin 13a asks.

[0022] At this example, in order to obtain the multilayer parison 70 as shown in A in drawing 3, in the condition [having held principal member resin 13a in the resin path 20 in the amount of fixed flowing down], the path adjust ring 23 for secondary members is dropped to drawing 2 to the location shown with a broken line by carrying out the feeding and discarding of the pressure oil to the resin flow control cylinder 25 for secondary members, and it is carried out by controlling the amount of flowing down of secondary-member resin 13b. Moreover, in order to obtain the parison 70 as shown in B in drawing 3, in the condition [having held principal member resin 13a in the resin path 20 in the amount of fixed flowing down], the path adjust ring 23 for secondary members is dropped until it contacts the penetration bore 14, and it is carried out by carrying out full cutoff of the flowing down of secondary-member resin 13b. Thus, the amount of flowing down of secondary-member resin 13b can be freely adjusted by going up and down the path adjust ring 23 for secondary members within the width of face of letter resin path of inclination 18a.

[0023]

[Effect of the Invention] The multilayer blow molding approach concerning this invention so that clearly also from having explained above The division mandrel which connected to the separate accumulator the extruder which supplies principal member resin, and the extruder which supplies secondary-member resin, and was divided into dice housing in same axle from the accumulator plunger is interpolated. Pressurization supply is carried out towards the dice with which the resin path was formed. After branching from the resin path inlet port by the side of an accumulator to hoop direction right and left of a division mandrel front face, a connoisseur faces [carrying out the laminating of principal member resin and the secondary-member resin in the thick direction], respectively each manifold which curved to the direction of extrusion toward the anti-resin input of said division mandrel. Since the part which mixes secondary-member resin to principal member resin by having adjusted the flow rate of the secondary-member resin which flows down a secondary-member resin path with the path adjust ring for secondary members prepared in the method of outside [path / principal member resin] is close to a resin delivery, The mixing percentage to the principal member resin of secondary-member resin can be adjusted more correctly. Furthermore, since supply of secondary-member resin can intercept the path adjust ring for secondary members completely only by descending to the maximum minimum, monolayer shaping of only principal member resin also becomes possible.

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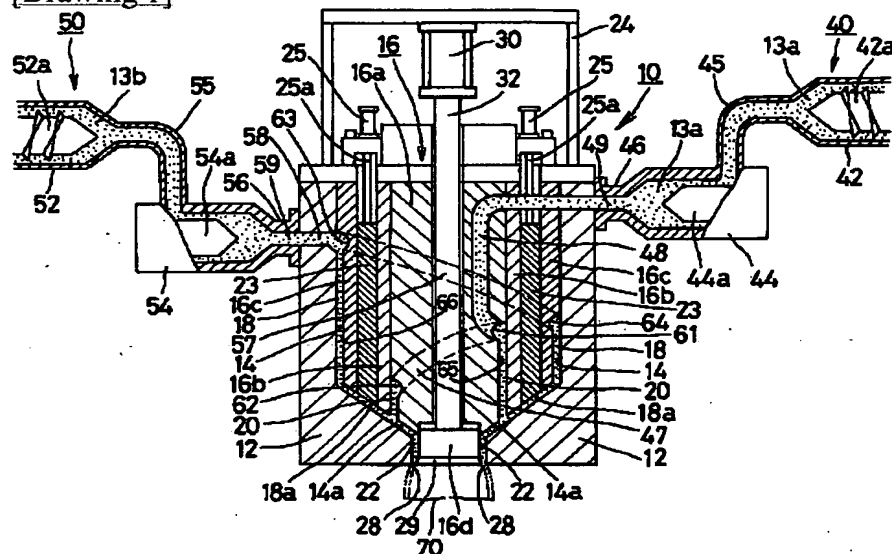
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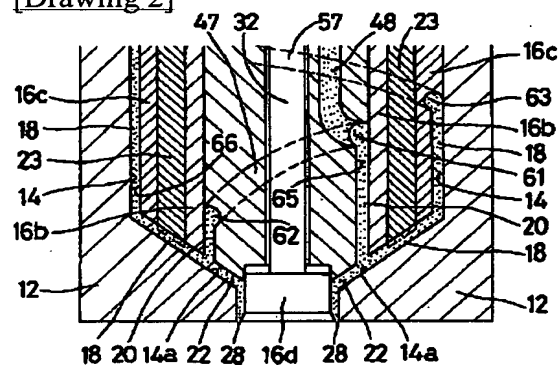
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DRAWINGS

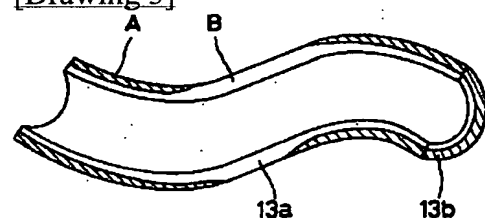
[Drawing 1]



[Drawing 2]



[Drawing 3]



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